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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,340	02/25/2004	Hiroyuki Akatsu	FIS920030411US1	2339

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INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

EXAMINER

NGUYEN, DAO H

ART UNIT PAPER NUMBER

2818

DATE MAILED: 12/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/708,340

Applicant(s)

AKATSU ET AL.

Examiner

Dao H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 5,6,8-10 and 21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 5, 6, 8-10, and 21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. This Office Action is in response to the communications dated 09/18/2006 through 10/07/2006.

Claims 5, 6, 8-10, and 21 are active in this application.

Claim(s) 1-4, 7, and 11-20 have been cancelled.

New claim(s) 21 have been added.

### Claim Objections

2. Claims 5 and 6 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter **of a previous claim**. Claim 5 depends on claim 21, which is not **a previous claim** of claim 5. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

### Remarks

3. Applicant's argument(s), filed 09/18/2006, have been fully considered, but are not persuasive. Particularly, Examiner do/does not agree with Applicant's argument(s) that Mochizuki (U.S. 5,481,120) fails to teach a bipolar transistor wherein a centerline of the emitter is in alignment with a centerline of the collector pedestal.

The bipolar transistors shown in figs. 1, 27, and 65 of Mochizuki are all clearly symmetrically arranged. Hence, the (vertical) centerline of the emitter 8 (fig. 1 for example) clearly coincides, and/or is in alignment with the (vertical) centerline of the collector pedestal 3. Therefore, Mochizuki does definitely disclose all claimed limitations.

### **Claim Rejections - 35 USC § 102**

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. **Claim(s) 1, 3, 4, and 7-10 are rejected under 35 U. S. C. § 102 (b) as being anticipated by U.S. Patent No. 5,481,120 to Mochizuki et al.**

Regarding claim 8, Mochizuki discloses a bipolar transistor, as shown in figs. 1, 2, 5-8, 26, 27, 50, 65, comprising:

a collector 3 (fig. 1 or fig. 27) or 110 (fig. 65) including a frustum-shaped collector pedestal 3 having an at least substantially planar upper surface, a lower surface, and a

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slanted sidewall extending between said upper surface and said lower surface, wherein said upper surface has an area substantially less than an area of said lower surface;

an intrinsic base 5 (figs. 1 or 27) or 111 (fig. 65) overlying all of said area of said upper surface of said collector pedestal 3/110;

an emitter 8 overlying said intrinsic base 5;

a raised extrinsic base 6/16 (figs. 27) or 112 (fig. 65) conductively connected to said intrinsic base 5/111; and

a dielectric region 4 (fig. 1) or 21 & 4 (fig. 27) or 121 (fig. 65) extending along said slanted sidewall of said collector pedestal 3 adjacent to said upper surface, wherein a centerline of said emitter 8 is in alignment with a centerline of said collector pedestal 3. See figs. 1, 27, 65, and the above remarks.

Regarding claim 9, Mochizuki discloses a bipolar transistor wherein each of said centerlines of said emitter 8 and said collector pedestal 3 is aligned to a wall of a single opening in a layered stack of materials. See figs. 1, 2, 5-8, 26, 27, 50, 65.

Regarding claim 10, Mochizuki discloses a bipolar transistor wherein said intrinsic base 5 includes a layer of a single-crystal semiconductor which forms a heterojunction with at least one of said emitter 5 and said collector pedestal 3. See figs. 1, 2, 5-8, 26, 27, 50, 65.

**Claim Rejections - 35 U.S.C. § 103**

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claim(s) 5 and 6 are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 5,481,120 to Mochizuki et al., in view of U.S. Patent No. 6,287,930 to Park.**

Regarding claim 21, Mochizuki discloses a bipolar transistor comprising all claimed limitations, including a conductive collector contact 12, said collector further including a first active area 2, 3 and a second active area 2 disposed in a single-crystal semiconductor region, each of said first and second active areas having major surfaces extending in lateral directions defining a major surface of said semiconductor region, said first active area underlying said collector pedestal 3 and said second active area being separated in at least one of said lateral directions from said first active area, wherein said collector contact via 12 overlies said second active area. See figs. 1, 2, 5-8, 26, 27, 50, 65.

Mochizuki fails to teach a shallow trench isolation wherein said first active area 2 underlying said collector pedestal 3 and said second active area 2 being separated in at

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least one of said lateral directions from said first active area 2 by said shallow trench isolation.

Park discloses a bipolar transistor shown in figs. 3-13, comprising a shallow trench isolation 77 or 16 (figs. 3, 13) and a conductive collector contact via 97, wherein a first active area underlying a collector pedestal 13 (between trenches 75, figs. 7-8) and said second active area being separated in at least one of said lateral directions from said first active area by said shallow trench isolation 77/16, and wherein said collector contact via 97 overlies said second active area. See figs. 3, 13.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Mochizuki so that it would further include an isolation trench as that/those of Park in order to provide electrical isolation to the device, and to obtain a more highly integrated bipolar junction transistors having improved electrically characteristics. See col. 2, lines 13-27, and lines 54-58 of Park.

Regarding claim 5, Mochizuki/Park discloses a bipolar transistor wherein said dielectric region includes a layer of silicon nitride (col. 12, lines 14-16 of Mochizuki) extending between said shallow trench isolation and said slanted sidewall of said collector pedestal. See figs. 3, 13 of Park.

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Regarding claim 6, Mochizuki/Park discloses a bipolar transistor further comprising a dielectric spacer 26, wherein said raised extrinsic base 6/16 is aligned to said emitter and spaced from said emitter by said dielectric spacer. See figs. of Mochizuki.

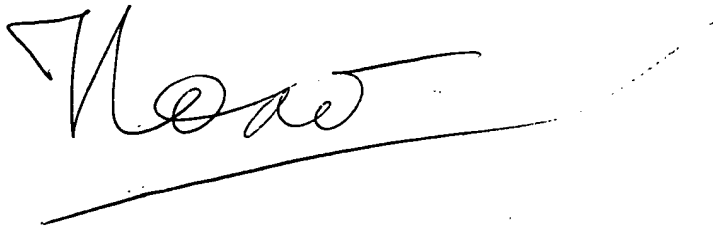
### **Conclusion**

8. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao H. Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday, 9:00 AM – 6:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith, can be reached on (571)272-1907. The fax numbers for all communication(s) is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

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A handwritten signature in black ink, appearing to read 'Dao H. Nguyen', with a long horizontal line extending from the end of the signature.

Dao H. Nguyen

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November 24, 2006